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EXAMINER
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ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 12/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/072,443

Applicant(s)

KIM, YONG-KIL

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al (USPat. 4,612,077) in view of Umotoy, Salvador P. et al (US 6,302,964 B1). Tracy teaches a gas (22; Figure 1) distribution apparatus (Figure 2,3; column 2, lines 55 - column 3, line 9) for supplying gas (22; Figure 1) into a semiconductor wafer processing chamber (16; Figure 1), the apparatus comprising:
  - i. a body (20; Figure 3; column 2, lines 55 - column 3, line 9) having a bottom wall and a plurality of gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) extending through the bottom wall; and an injection plate (12; Figure 3; column 2, lines 55-62), attached by being screwed to the bottom surface of the body's (20; Figure 3; column 2, lines 55 - column 3, line 9) bottom wall, the injection plate (12; Figure 3; column 2, lines 55-62) having grooves (68, 70, 72; Figure 3; column 3, lines 20-30) on an upper surface of the injection plate that connect the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26), the injection plate also having injection holes (34, 36, 38; Figure 2, 3; column 3, lines 5-10) that perforate the injection plate at predetermined intervals (radial distances of 28, 30, 32, and 27; Figures 2,3) throughout the grooves, - claim 1

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- ii. The apparatus, as defined in claim 1, wherein the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) are formed at different distances from a center of the bottom wall, as claimed by claim 2
- iii. The apparatus, as defined in claim 1, wherein the body (20; Figure 3; column 2, lines 55 - column 3, line 9) additionally comprises one gas inlet extension (40; Figure 3) that is integral to the bottom wall such that the gas inlet protrudes upwardly from the bottom wall, as amended by claim 3
- iv. The apparatus, as defined in claim 1, wherein an external periphery of an upper portion of the body (20; Figure 3; column 2, lines 55 - column 3, line 9) is fastened to the chamber, as claimed by claim 4 – Figure 1 shows coolant pipes 20 and gas pipe (40; Figure 3) fixed both to the body and the chamber 16.
- v. The apparatus, as defined in claim 1, wherein the grooves (68, 70, 72; Figure 3; column 3, lines 20-30) include a ring-shaped groove (72; Figure 3; column 3, lines 20-30) with a large diameter and a ring-shaped groove (68; Figure 3; column 3, lines 20-30) with a small diameter, as claimed by claim 5
- vi. The apparatus, as defined in claim 1, wherein the injection plate (12; Figure 3; column 2, lines 55-62) is attached to the bottom wall with a plurality of screws (26; Figure 2, 3), as claimed by claim 6
- vii. A gas (22; Figure 1) distribution apparatus (Figure 2,3; column 2, lines 55 - column 3, line 9) of semiconductor equipment to supply gas (22; Figure 1) into a chamber for a plasma etching process (Title), the apparatus comprising: a body (20; Figure 3; column 2, lines 55 - column 3, line 9) having a plurality of gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3;

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column 3, lines 19-26) and a cooling (24; Figure 1, 3) path configured to circulate coolant (column 2, lines 55-62) inside the body; and an injection plate (12; Figure 3; column 2, lines 55-62) attached to a bottom surface of the body (20; Figure 3; column 2, lines 55 - column 3, line 9), the injection plate (12; Figure 3; column 2, lines 55-62) having an upper interior surface with grooves (68, 70, 72; Figure 3; column 3, lines 20-30) that connect the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26), the injection plate also having injection holes (34, 36, 38; Figure 2, 3; column 3, lines 5-10) that perforate the injection plate formed at a predetermined intervals (radial distances of 28, 30, 32, and 27; Figures 2,3) inside the grooves, as claimed by claim 7 – That Tracy does not teach that his coolant is water is not an apparatus limitation. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- viii. The apparatus, as defined in claim 7, wherein the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) are formed at different distances from the center of a bottom part of the body (20; Figure 3; column 2, lines 55 - column 3, line 9), as claimed by claim 8

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- ix. The apparatus, as defined in claim 7, wherein the body additionally comprises a gas inlet extension (40; Figure 3) that is integral to the body such that the gas (22; Figure 1) inlet (40) protrude upward from the body (20; Figure 3; column 2, lines 55 - column 3, line 9), as claimed by claim 9
- x. The apparatus, as defined in claim 7, wherein an external periphery of an upper portion of the body (20; Figure 3; column 2, lines 55 - column 3, line 9) is fastened to the chamber, as claimed by claim 10 – Figure 1 shows coolant pipes 20 and gas pipe (40; Figure 3) fixed both to the body and the chamber 16
- xi. The apparatus, as defined in claim 7, wherein the grooves include ring-shaped groove (72; Figure 3; column 3, lines 20-30) with a large diameter and a ring-shaped groove (68; Figure 3; column 3, lines 20-30) with a small diameter, as claimed by claim 11
- xii. The apparatus, as defined in claim 7, wherein the injection plate (12; Figure 3; column 2, lines 55-62) is attached to the bottom surface with a plurality of screws (26; Figure 2, 3), as claimed by claim 12
- xiii. The apparatus, as defined in claim 7, wherein the cooling (24; Figure 1, 3) coolant path includes in injecting hole (24/20 interface) and a discharging hole (not labeled; Figure 1,3) as claimed by claim 13 – That Tracy does not teach that his coolant is water is not an apparatus limitation. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is

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capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Tracy does not teach that his body (20; Figure 3; column 2, lines 55 - column 3, line 9) has a bottom wall and a plurality of gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) that perforate the bottom wall. Further Tracy does not teach that his injection plate (12; Figure 3; column 2, lines 55-62) is integral as required by amended claim 1, and that the injection plate (12; Figure 3; column 2, lines 55-62) has an upper exterior surface with grooves (68, 70, 72; Figure 3; column 3, lines 20-30). Tracy further does not teach:

- i. a plurality of gas inlet extensions that are integral to the bottom wall such that the gas inlets protrude upwardly from the bottom wall, as amended by claim 3
- ii. a plurality of gas inlet extensions that are integral to the body such that the gas inlets protrude upward from the body, as claimed by claim 9
- iii. Tracy does not teach that the injecting and discharging holes are upwardly protruded from the bottom part of the body (20; Figure 3; column 2, lines 55 - column 3, line 9), as claimed by claim 14.

Umotoy teaches a gas (116, 118; Figure 1) distribution apparatus (Figure 1; column, line 3 - column 4, line 13) for supplying gasses (116, 118; Figure 1) into a semiconductor wafer processing chamber (100; Figure 1).

Specifically, Umotoy teaches his body (130; Figure 9) has a bottom wall (148; Figure 9) and a plurality of gas inlets (204, 206, 210; Figure 9) that perforate the bottom wall as is claimed in claim 1. Further, Umotoy teaches:

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- iv. The apparatus, as defined in claim 1, wherein the body (130; Figure 9) additionally comprises a plurality of gas inlet extensions (200; Figure 5) that are integral to the bottom wall (148) such that the gas inlets protrude upwardly from the bottom wall, as claimed by claim 3
- v. The apparatus, as defined in claim 7, wherein the body (130; Figure 1) additionally comprises a plurality of gas inlet extensions (200; Figure 5) that are integral to the body such that the gas inlets (204, 206, 210; Figure 9) protrude upward from the body (130; Figure 1), as claimed by claim 9, 14

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make Tracy's injection plate (12; Figure 3; column 2, lines 55-62) integral with exterior grooves (68, 70, 72; Figure 3; column 3, lines 20-30) and add Umotoy's gas distribution body along Tracy's slots 42, 44, 46, and 48 thereby providing a plurality of gas inlet extensions that are integral to Tracy's bottom wall such that Tracy's gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) protrude upwardly from the bottom wall as taught by Umotoy.

Motivation to make Tracy's injection plate (12; Figure 3; column 2, lines 55-62) integral with exterior grooves (68, 70, 72; Figure 3; column 3, lines 20-30) and add Umotoy's gas distribution body along Tracy's slots 42, 44, 46, and 48 thereby providing a plurality of gas inlet extensions that are integral to Tracy's bottom wall such that Tracy's gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) protrude upwardly from the bottom wall as taught by Umotoy is to provide even distribution to the process region as taught by Umotoy (column 1, lines 35-45) and to deliver plural unmixed gasses to the reactor chamber as taught by Umotoy (column 2, lines 45-65). Further, it is well established that the duplication of parts is obvious (In re Harza ,



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274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04). Further, it is held obvious that the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice. (MPEP2144.04 - In re Larson, 340 F.2d 965, 968, 144 USPQ 347,349 (CCPA 1965)).

### *Response to Arguments*

3. Applicant's arguments filed October 4, 2004 have been fully considered but are not persuasive.

Applicant states:

“

Claim 1 recites that the injection plate is formed of a single, integral unit (emphasis added). It was agreed in the office action (page 6, lines 11-12) that Tracy fails to teach this feature. Although Umotoy speaks of a “one-piece gas distribution faceplate” in the summary of the Invention (column 2; lines 53-54), it is apparent that Umotoy's faceplate is not formed of a single, integral unit because “the faceplate 130 contains two components, a lower gas distribution plate 148 and a[n] upper gas distribution plate 150” (FIG. 1; column 4, lines 27-28; emphasis added).

“

In response, however, the Examiner cites the bounds of Applicant's “integral” claim requirement:

Integral : 1c: formed as a unit with another part 2: composed of integral parts<sup>1</sup>

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<sup>1</sup> Merriam-Webster's Collegiate Dictionary - 10th Ed. p.607

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As such, although the Examiner agrees that Tracy does not teach that his injection plate (12; Figure 3; column 2, lines 55-62) is integral in the sense that said injection plate is not monolithic, the Examiner believes that the combined teaching of Tracy and Umotoy teach monolithic gas distribution components: "one-piece gas distribution faceplate" in the summary of the Invention (Umotoy: column 2; lines 53-54)

4. Applicant states:

“

Umotoy (column 1, lines 35-45) says nothing about the structure of an injection plate except that “the plate contains a plurality of holes such that the gaseous mixture is evenly distributed in the process region” (lines 42-44). The most that is suggested by this paragraph is that even distribution of the gaseous mixture may be achieved by using a plurality of holes. Whether a plate has a plurality of holes has no bearing on whether the plate should be formed of a single integral piece or many component pieces. It certainly does not suggest any advantage to making Tracy's injection plate 12 integral.

“

In response, the Examiner cites that references must be considered as a whole for what they teach and suggest to those of ordinary skill:

Basic Considerations Which Apply to Obviousness Rejections – MPEP 2141

When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

- (A) The claimed invention must be considered as a whole;
- (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;

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(C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and

(D) Reasonable expectation of success is the standard with which obviousness is determined.

*Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986)

As a result, Umotoy's "one-piece gas distribution faceplate" (column 2; lines 53-54) is a component and means for achieving the very benefits taught by Umotoy and cited by the Examiner: Motivation ... "is to provide even distribution to the process region as taught by Umotoy (column 1, lines 35-45) and to deliver plural unmixed gasses to the reactor chamber as taught by Umotoy (column 2, lines 45-65)".

5. In response to applicant's argument that "There is no motivation to maintain separation of gasses within Tracy's faceplate 112 because Tracy has only one gas source (gas supply 22: Figs 1 and 3)", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Further, Applicant's own gas inducing inlets (13; Figures 3 and 4) are not specific for "maintaining separation of gasses". Nowhere in Applicant's specification or drawings does Applicant teach or suggest means by which such plural gases are maintained separated prior to introduction into Applicant's processing chamber ([0004]). For example, there is no additional piping/tubing connected to Applicant's gas inducing inlets (13; Figures 3 and 4) but only, as

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suggested by the drawings, a header space (10; Figure 3,4) above Applicant's gas inducing inlets (13; Figures 3 and 4) similar to Tracy's own plenum (44; Figure 3).

6. Applicant states that the combination of Tracy et al (USPat. 4,612,077) in view of Umotoy, Salvador P. et al (US 6,302,964 B1) would render the Tracy invention inoperable because:

“

If Tracy is modified so that the electrode 12 is made integral as is suggested, then the electrode plate 12 becomes unsatisfactory for varying the number of gas entry slits adjusting the number and lengths of the capillaries, and for being easily disassembled to permit cleaning of corrosive products. Therefore, there is no suggestion to modify Tracy by making the alleged injection plate (Tracy's electrode 12) integral.

“

In response, Applicant has not given relevant rationale in supporting his position that Tracy's apparatus would cease to function under the proposed combination. In particular, the proposed combination of “Motivation to make Tracy's injection plate (12; Figure 3; column 2, lines 55-62) integral...” would still render Tracy's injection plate electrode functional for its intended purpose of distributing gases as desired by Tracy and providing an electrical potential to Tracy's chamber 16. Further, Tracy's integral components could still be used under Tracy's stated benefits by replacing integral plates each with varied gas entry slits by easy disassembly (26; Figure 3) as taught by Tracy.

7. The Examiner agrees, as stated in the above rejections, with Applicant's position that Tracy's grooves (68, 70, 72; Figure 3; column 3, lines 20-30) are indeed located within Tracy's

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injection plate (12; Figure 3; column 2, lines 55-62), and thus, Tracy does not teach that Tracy's grooves (68, 70, 72; Figure 3; column 3, lines 20-30) are located "on an upper surface of Tracy's injection plate (12; Figure 3; column 2, lines 55-62)". However, the Examiner reaffirms that there is sufficient teaching in Tracy to provide motivation for relocating/extending Tracy's grooves (68, 70, 72; Figure 3; column 3, lines 20-30) such that they are located on Tracy's upper exterior surface for gas pressure/flow optimization (column 1; lines 55-68) – See lower groove position in Tracy's Figure 3. Further, it is well established that changes in apparatus dimensions (groove height) are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

8. Applicant believes the Examiner's citation in Tracy does not support the Examiner's position that Tracy supports the teaching to optimize the dimensions of Tracy's grooves (68, 70, 72; Figure 3; column 3, lines 20-30) are located "on an upper surface of Tracy's injection plate (12; Figure 3; column 2, lines 55-62)". The Examiner again urges Applicant to consider the teaching of Tracy as a whole. Refer to paragraph 4 above.

9. Applicant's definition of "plenum", although mentioned in the Tracy specification, is not supported by the function of Tracy's grooves (68, 70, 72; Figure 3; column 3, lines 20-30). An art-specific consideration of "plenum" is simply a volume, that, in the process gas delivery art, has a flow therethrough as is clearly taught by Tracy.

10. Applicant states "*...nowhere is it shown that the capillaries are attached to the the alleged body 20*" in support of Applicant's claim limitation "the body has a plurality of gas inlets

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that perforate the bottom wall ” (claim 1). The Examiner cites Tracy: “Tracy does not teach that his body (20; Figure 3; column 2, lines 55 - column 3, line 9) has a bottom wall and a plurality of gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) that perforate the bottom wall”. Yet, the Examiner stated that motivation for Tracy’s gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) to protrude upwardly from the bottom wall as taught by Umotoy is to provide even distribution to the process region as taught by Umotoy (column 1, lines 35-45) and to deliver plural unmixed gasses to the reactor chamber as taught by Umotoy (column 2, lines 45-65). Further, it is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04). Further, it is held obvious that the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice. (MPEP2144.04 - In re Larson, 340 F.2d 965, 968, 144 USPQ 347,349 (CCPA 1965)). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

### ***Conclusion***

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (571) 272-1439.

  
12/16/14